[0016] FIG. **3** illustrates an example of a flexible hinge of the portable electronic device of FIG. **1** with the device in an open position in accordance with an embodiment of the inventive arrangements;

[0017] FIG. **4** illustrates an example of several internal components of the flexible hinge of FIGS. **2** and **3** in accordance with an embodiment of the inventive arrangements;

[0018] FIG. **5** illustrates an example of several cams and cam springs in accordance with an embodiment of the inventive arrangements; and

[0019] FIG. **6** illustrates an example of a cam in accordance with an embodiment of the inventive arrangements;

DETAILED DESCRIPTION OF THE INVENTION

[0020] While the specification concludes with claims defining the features of the invention that are regarded as novel, it is believed that the invention will be better understood from a consideration of the following description in conjunction with the drawings, in which like reference numerals are carried forward.

[0021] As required, detailed embodiments of the present invention are disclosed herein; however, it is to be understood that the disclosed embodiments are merely exemplary of the invention, which can be embodied in various forms. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present invention in virtually any appropriately detailed structure. Further, the terms and phrases used herein are not intended to be limiting but rather to provide an understandable description of the invention.

[0022] The terms "a" or "an," as used herein, are defined as one or more than one. The term "plurality," as used herein, is defined as two or more than two. The term "another," as used herein, is defined as at least a second or more. The terms "including" and/or "having," as used herein, are defined as comprising (i.e., open language). The terms "coupled" and "engagement," as used herein, are defined as connected, although not necessarily directly, and not necessarily mechanically.

[0023] The present invention concerns a flip-type portable electronic device that can include a base portion, a flip portion and a flexible hinge that may couple the flip portion to the base portion. The flexible hinge flexible hinge can include a plurality of interlocking links that can rotate about a plurality of axles contained within the flexible hinge, and the interlocking links may rotate independently of one another. The rotation of the interlocking links can allow the flip portion to rotate with respect to the base portion.

[0024] In one arrangement, the flip portion may remain in any one of a plurality of positions as it rotates with respect to the base portion. Each position that the flip portion may remain in can correspond to one of a plurality of dwell positions that each link rotates between. As such, a user may rotate the flip portion to any desired position with respect to the base portion.

[0025] Referring to FIG. **1**, an example of a flip-type portable electronic device **100** is shown. In this example, the portable electronic device **100** may be a flip-type mobile communications unit, such as a cellular phone, although the invention is not so limited. In one embodiment, the device **100** can include a flip portion **110**, a base portion **112** and a flexible hinge **114**, which can couple the flip portion **110** to the base portion **112**. The flexible hinge **114** can include one or more links **115**, which can be interlocking members, as shown. As will be explained below, the interlocking links **115** may rotate about a plurality of axles (not shown here) contained within the flexible hinge **114** and the interlocking links **115** may rotate independently of one another. The rotation of the interlocking links **115** can allow the flip portion **110** to rotate with respect to the base portion **112**. In one arrangement, the base portion **112** can include a keypad **116**, and the flip portion **110** can have one or more displays **118**.

[0026] In this example, the flip portion **110** may be in a first state of rotation in which at least one end **119** of the flip portion **110** may rest against the base portion **112**, and an opening **120** may be formed between a second end **121** of the flip portion **110** and the base portion **112**. This opening **120** can receive a mechanism (not shown) that can hold the device **100**. For example, the flip portion **110** and the base portion **112** may be closed around a belt or a purse strap, for example, and the belt or strap can hold the device **100** in place.

[0027] Referring to FIG. **2**, a cross-sectional view of the flexible hinge **114** in a closed position is shown. This closed position refers to the end **119** of the flip portion **110** resting or sitting on the base portion **112** (see FIG. **1**). The links **115** can rotate about axles **122** for a number of degrees. As an example, a segment **123** of the flip portion **110** can be considered a link **115**, too. In particular, the links **115** can include a shell portion **124** and an engagement portion **126**, and the engagement portion **126** of a first link **115** can slide into and fit within the shell portion **124** of a second link **115**. The interlocking nature of the links **115** can also be seen in FIG. **1**. This feature can help the links **115** rotate about the axles **122**. A number of cams **128** can be positioned in the links **115**, and their operation will be described below. An example of the flexible hinge **114** in an open position is shown in FIG. **3**. For purposes of the invention, an open position can be any position of the device **100** in which the end **119** of the flip portion **110** (see FIG. **1**) is lifted off of the base portion **112**.

[0028] In one arrangement, the flip portion **110** may remain in any one of a plurality of portions as it rotates with respect to the base portion **112**. As an example, each position that the flip portion **110** may remain in can correspond to one of a plurality of dwell positions that each link **115** can rotate between. For example, the flip portion **110** may rotate about 155 degrees with respect to the base portion **112**. In accordance with an embodiment of the inventive arrangements, the flip portion **110** may remain in any fractional degree value of this 155 degree rotation, and these values may correspond to positions that the links **115** can rotate between.

[0029] For example, the links **115** may rotate from zero degrees to about thirty-one degrees. In particular, focusing on FIG. **2**, the engagement portions **126** of the links **115** can be at a first position, such as zero degrees, which may also